

# **EXHIBIT 11**

**FILED UNDER SEAL**

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**UNITED STATES DISTRICT COURT  
NORTHERN DISTRICT OF CALIFORNIA  
SAN FRANCISCO DIVISION**

GOOGLE LLC,

Plaintiff

v.

Case No. 3:20-cv-06754-WHA

SONOS, INC.,

Defendant.

**GOOGLE LLC’S THIRD SUPPLEMENTAL OBJECTIONS AND RESPONSES TO  
PLAINTIFF SONOS, INC.’S FIRST SET OF FACT DISCOVERY INTERROGATORIES  
(NO.15)**

Pursuant to Rule 33 of the Federal Rules of Civil Procedure, Defendant Google LLC (“Google”) hereby objects and responds to Plaintiff Sonos, Inc.’s (“Sonos”) First Set of Fact Discovery Interrogatories to Defendant (“Interrogatories”). Google responds to these Interrogatories based on its current understanding and the information reasonably available to Google at the present time. Google reserves the right to supplement these responses if and when additional information becomes available.

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**GENERAL OBJECTIONS AND RESPONSES**

1  
2 1. These responses are made only for the purposes of discovery in this action. Each  
3 response is subject to all appropriate objections as to competence, relevance, materiality, and any  
4 and all other objections and grounds that would require the exclusion of any information,  
5 documents, or statements contained in the responses if such information, documents, or statements  
6 were offered in court. Google expressly reserves all such objections and may interpose them at the  
7 time of trial or at any other time.

8 2. Google reserves all objections as to the admissibility at trial of any information or  
9 documents identified in its responses to these Interrogatories. By identifying any document or  
10 supplying any information, Google does not admit that such information or document is relevant to  
11 or admissible in this litigation. Google reserves the right to object to further inquiry with respect to  
12 any subject matter.

13 3. Google objects to the interrogatories, and to the definitions, to the extent that they  
14 purport to impose any obligations upon Google beyond the Federal Rules of Civil Procedure and  
15 the Local Rules of the United States District Court for the Northern District of California.

16 4. Google objects to the definition of “Defendant,” “Google,” “You,” or “Your” on the  
17 grounds that the definitions are overly broad, unduly burdensome, and vague, including but not  
18 limited to the extent that they include: any Google parent, subsidiary, division, or related company;  
19 any business entity controlled by or operated on behalf thereof; any predecessors thereof; and any  
20 and all agents, directors, owners, officers, attorneys, employees, representatives, subcontracts,  
21 and/or any person acting on its behalf.

22 5. Google objects to the definition of “Accused Cast-Enabled App(s)” on the grounds  
23 that the definition is overly broad, unduly burdensome, and vague, including but not limited to the  
24 extent that it includes: any Google Cast-enabled app other than the YouTube Music app, Google  
25 Play Music app, YouTube app, Google Podcasts app, and YouTube TV app, and any third-party  
26 Cast-enabled app that allows a user to “cast” to an Accused Cast-Enabled Media Player (including  
27 but not limited to the Spotify app), and any Cast-enabled software (e.g., firmware and/or Cast-  
28 enabled apps) executable on an Accused Cast-Enabled Display that enables a user to “[m]ove media

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1 from one cast device to another,” either collectively or individually. Google will respond with  
2 respect to the YouTube Music app, Google Play Music app, YouTube app, Google Podcasts app,  
3 and YouTube TV app.

4 6. Google objects to the definition of “Accused Google Product(s)” to the extent it  
5 includes Sonos’s definition of the term “Accused Cast-Enabled App(s).”

6 7. Google objects to the definition of “Accused Google Server[s]” on the grounds that  
7 the definition is overly broad, unduly burdensome, and vague, including but not limited to the extent  
8 that it purports to include: any server that hosts at least one of the Accused Cast-Enabled App(s) for  
9 download, any server that facilitates casting from Chromecast-enabled apps to Accused Cast-  
10 Enabled Media Player(s), any server that facilitates moving media from one cast device to another,”  
11 and any server that, in response to user input at any Accused Cast-Enabled App, facilitates delivering  
12 media to an Accused Cast-Enabled Media Player (including but not limited to any Cloud Content  
13 Delivery Network (CDN) server), either collectively or individually. Google will respond with  
14 respect to the servers specifically accused in Sonos’s infringement contentions.

15 8. Google objects to the instructions regarding “identify,” “describe,” or “identity” in  
16 the context of a person on the grounds that the instructions are overly broad, unduly burdensome,  
17 and vague, including but not limited to the extent that they require inclusion of: the person’s present  
18 or last known home address, business and e-mail addresses, and respective phone numbers; present  
19 or last known place of employment and position; and his or her connection to the subject matter of  
20 the interrogatory.

21 9. Google objects to the instructions to “identify,” “describe,” or specify the “identity”  
22 in the context of a person who is a past or present director, officer, employee, agent, or representative  
23 of Google on the grounds that the instructions are overly broad, unduly burdensome, and vague,  
24 including but not limited to the extent that they require specification of: all positions or employments  
25 held by that person with Google, and the dates between which each such position or employment  
26 was held.

27 10. Google objects to the instructions to “identify,” “describe,” or specify the “identity”  
28 in the context of an entity on the grounds that the instructions are overly broad, unduly burdensome,

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1 and vague, including but not limited to the extent that they require specification of: the entity’s place  
2 of incorporation or other business organization; it’s principal places of business; its present or last  
3 known mailing and physical address(es) and e-mail and website addresses; its present or last known  
4 phone number; the type of entity or organization, its date and place of formation and any place(s) in  
5 which it is registered to conduct business; its registered agent; and the identity of all individuals  
6 employed by or acting for it at any time who have knowledge of the matter with respect to which  
7 the entity is identified.

8 11. Google objects to the instructions to “identify,” “describe,” or specify the “identity”  
9 in the context of a document on the grounds that the instructions are overly broad, unduly  
10 burdensome, and vague, including but not limited to the extent that they require specification of: the  
11 date it was authored, sent, and/or received; the identity of the author of the document; the identity  
12 of any recipient of the document; and the identity of the custodian of the document.

13 12. Google objects to the instructions to “identify,” “describe,” or specify the “identity”  
14 in the context of a communication on the grounds that the instructions are overly broad, unduly  
15 burdensome, and vague, including but not limited to the extent that they require specification of: the  
16 date it was authored, sent, and/or received; the identity of the author of the document; the identity  
17 of any recipient of the document; and the identity of the custodian of the document. Google further  
18 objects to the instructions regarding “identify,” “describe,” or “identity” in the context of a  
19 communication to the extent that they suggest Google is required to search and produce  
20 electronically stored information (ESI) before Sonos has shown good cause for ESI discovery, and  
21 the parties have agreed on a procedure for doing so in accordance with the Court’s Standing Order.

22 13. Google objects to the instructions to “identify,” “describe,” or specify the “identity”  
23 in the context of a thing on the grounds that the instructions are overly broad, unduly burdensome,  
24 and vague, including but not limited to the extent that they require specification of: its physical  
25 particulars; the day on which it was made; the identity of the persons who made it; the identity of  
26 the persons who asked that it be made; its present condition; and its present location.

27 14. Google objects to the instructions to “state all facts” on the grounds that the  
28 instructions are is overly broad, unduly burdensome, and vague, including but not limited to the

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1 extent that it requires specification of: the identification of any person or entity having knowledge  
2 of any such fact, including the last known address and phone number and the identity of any  
3 document, communication, or thing that refers, relates, or evidences any such fact.

4 15. Google objects to each interrogatory to the extent it seeks information protected by  
5 the attorney-client privilege or the work product doctrine or that is otherwise privileged or protected  
6 from discovery.

7 16. Google objects to each interrogatory to the extent that it seeks information that is not  
8 relevant to any claim or defense of any party or to the subject matter of this action, and is thus not  
9 proportional to the needs of the case.

10 17. Google objects to each interrogatory to the extent it is compound and contains  
11 multiple subparts.

12 18. Google objects to each interrogatory to the extent it is overbroad, unduly  
13 burdensome, vague, and/or ambiguous.

14 19. Google objects to each interrogatory to the extent it seeks information that does not  
15 already exist or that is not in Google’s possession, custody, or control.

16 20. Google objects to each interrogatory to the extent it requires Google to provide  
17 information beyond what is available to Google at present from a reasonable search of its own files  
18 likely to contain relevant or responsive documents and from a reasonable inquiry of its present  
19 employees.

20 21. Google objects to each interrogatory to the extent it seeks confidential or proprietary  
21 information, including without limitation, confidential business information, proprietary and/or  
22 competitively sensitive information, or trade secrets. Subject to its other General Objections, and  
23 to any specific objections set forth below, Google will only provide relevant information in a manner  
24 consistent with a Protective Order entered by the Court in this matter.

25 22. Google objects to each interrogatory to the extent it is unlimited in time or otherwise  
26 not limited to a timeframe relevant to this litigation, and is therefore burdensome, oppressive, overly  
27 broad, and not proportional to the needs of the case.

28

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1           23.     Google objects to each interrogatory to the extent it seeks a legal conclusion or expert  
2 testimony.

3           24.     Google objects to each interrogatory to the extent it seeks information that is publicly  
4 available and therefore as accessible to Sonos as to Google.

5           25.     Google objects to each interrogatory to the extent that it is premature. Discovery is  
6 ongoing, and Google has not yet completed its investigation of the matters at issue in this action.  
7 Google reserves the right to modify, supplement, change or amend its responses after the Court has  
8 issued its claim construction order, and once Google has conducted the necessary discovery and  
9 investigation.

10          26.     Google’s responses are not to be construed as an admission that any of the requested  
11 information exists, that any information is admissible, relevant or proportional to the needs of the  
12 case, or that any contention or assumption contained in the interrogatories, whether implicit or  
13 explicit, is correct.

**HIGHLY CONFIDENTIAL – ATTORNEYS’ EYES ONLY****OBJECTIONS AND RESPONSES TO FACT DISCOVERY INTERROGATORIES****INTERROGATORY NO. 15:**

For each of the YouTube, YouTube Music, YouTube TV, Google Play Music, Google Podcasts, and Spotify media services, describe in detail how an Accused Google Product (e.g., an Accused Cast-Enabled Media Player or Accused Pixel Device) receives and then plays back a sequence of media items (e.g., songs, podcast episodes, etc.) in connection with a given one of the aforementioned media services including, but not limited to, (i) describing in detail any communications between the Accused Google Product and any web server (e.g., Accused Google Server or third-party server) and how such communications take place, (ii) describing in detail how any Accused Google Server generates, maintains, and/or updates a set of one or more media-item “recommendations”<sup>1</sup> that are sent to the Accused Google Product and how those “recommendations” are sent to the Accused Google Product, and (iii) describing in detail how any Accused Google Server facilitates Google’s “Autoplay feature”<sup>2</sup> for playback at the Accused Google Product and how the “Autoplay feature” is utilized at the Accused Google Product.

**OBJECTIONS:** Google incorporates by reference all of its General Objections as if fully set forth herein. Google objects to the characterization of this interrogatory as a single interrogatory given that it contains multiple discrete subparts under Fed. R. Civ. P. 33(a)(1). Google objects to this interrogatory on the grounds that it is vague, ambiguous, unclear as to information sought, and lacking sufficient particularity to permit Google to reasonably prepare a response with respect to the undefined terms “receives and then plays back a sequence of media items,” “in connection with a given one of the aforementioned media services,” “communications between the Accused Google Product and any web server,” “how such communications take place,” “generates, maintains and/or updates,” “how those ‘recommendations’ are sent to the Accused Google Product,” “how any

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<sup>1</sup> See, e.g., <https://www.youtube.com/howyoutubeworks/product-features/recommendations/>; <https://support.google.com/youtubemusic/answer/6313542?hl=en>; <https://support.google.com/websearch/answer/10017274?hl=en&co=GENIE.Platform%3DAndroid#zippy=>.

<sup>2</sup> See, e.g., <https://support.google.com/youtube/answer/6327615?hl=en&co=GENIE.Platform%3DAndroid>; <https://support.google.com/websearch/answer/10017274?hl=en&co=GENIE.Platform%3DAndroid#zippy=>.



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1 Accused Google Server facilitates Google’s ‘Autoplay feature’ for playback at the Accused  
2 Product,” and “how the ‘Autoplay feature’ is utilized at the Accused Google Product.” Google  
3 further objects to this interrogatory to the extent that it assumes the existence of hypothetical facts  
4 that are incorrect or unknown to Google.

5 Google also objects to this interrogatory as overbroad, burdensome, and not proportional to  
6 the needs of the case, including to the extent it seeks information that is not relevant to any claim or  
7 defense of any party or to the subject matter of this action, including to the extent that it seeks  
8 information regarding non-accused instrumentalities or technology such as “Spotify media services”  
9 and “third-party server[s].” Google further objects to this interrogatory as overbroad and unduly  
10 burdensome to the extent that it seeks information that is publicly available, not uniquely within the  
11 control of Google, or is equally available to Sonos. Google additionally objects to this interrogatory  
12 to the extent it seeks communications and information protected from disclosure by the attorney-  
13 client privilege and/or attorney work product doctrine. Google further objects to this interrogatory  
14 to the extent it seeks confidential and/or proprietary business information. Google also objects to  
15 this interrogatory to the extent that it premature seeks expert discovery, opinion, and/or testimony.  
16 Google additionally objects to this interrogatory to the extent it seeks information that is not  
17 reasonably accessible or that is not within Google’s possession, custody, or control. Google further  
18 objects to this interrogatory to the extent it seeks information that is unnecessarily cumulative or  
19 duplicative of information sought by other discovery, including Request for Production No. 20.

**RESPONSE:**

21 Subject to and without waiving the foregoing General and Specific objections, Google  
22 responds, as follows:

23 Pursuant to Rule 33(d) of the Federal Rules of Civil Procedure, Google further refers Sonos  
24 to the source code that Google has made available and the following documents containing  
25 information responsive to this interrogatory: GOOG-SONOSWDTX-00005033-53611.

26 **SUPPLEMENTAL RESPONSE:** Google maintains the General and Specific objections  
27 set forth above. Google further objects to this interrogatory on the grounds that it is vague and  
28

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1 ambiguous to the extent it seeks information regarding products not specifically identified by make  
 2 or model number in Sonos’s infringement contentions. Google also objects to this interrogatory to  
 3 the extent it seeks to encompass Spotify, which is a separate, third-party application. Subject to and  
 4 without waiving the foregoing General and Specific objections, Google responds, as follows:

5 Google refers Sonos to the source code that Google has made available, which is the best  
 6 evidence of how the devices operate with respect to the operation of the accused functionalities.  
 7 Pursuant to Rule 33(d) of the Federal Rules of Civil Procedure, Google further refers Sonos to the  
 8 following documents created during product development which may contain information response  
 9 to this interrogatory: GOOG-SONOSWDTX-00041650, GOOG-SONOSWDTX-00039521,  
 10 GOOG-SONOSWDTX-00041722, GOOG-SONOSWDTX-00040397, GOOG-SONOSWDTX-  
 11 00042266, GOOG-SONOSWDTX-00042272, GOOG-SONOSWDTX-00042282, GOOG-  
 12 SONOSWDTX-00042365, GOOG-SONOSWDTX-00042378, GOOG-SONOSWDTX-00042380,  
 13 GOOG-SONOSWDTX-00042385, GOOG-SONOSWDTX-00042397, GOOG-SONOSWDTX-  
 14 00042402, GOOG-SONOSWDTX-00042404, GOOG-SONOSWDTX-00042413, GOOG-  
 15 SONOSWDTX-00042754, GOOG-SONOSWDTX-00042954, GOOG-SONOSWDTX-00043052,  
 16 GOOG-SONOSWDTX-00043318, GOOG-SONOSWDTX-00043323, GOOG-SONOSWDTX-  
 17 00043799-803, GOOG-SONOSWDTX-00043820, GOOG-SONOSWDTX-00051820, GOOG-  
 18 SONOSWDTX-00051848, GOOG-SONOSWDTX-00051918, GOOG-SONOSWDTX-00051924,  
 19 GOOG-SONOSWDTX-00051927, GOOG-SONOSWDTX-00052944-71, GOOG-  
 20 SONOSWDTX-00051608, GOOG-SONOSWDTX-00051943, GOOG-SONOSWDTX-00037978,  
 21 GOOG-SONOSWDTX-00051947, GOOG-SONOSWDTX-00037634, GOOG-SONOSWDTX-  
 22 00053379, GOOG-SONOSWDTX-00036998, GOOG-SONOSWDTX-00037178, GOOG-  
 23 SONOSWDTX-00037042, GOOG-SONOSWDTX-00037081, GOOG-SONOSWDTX-00037220,  
 24 GOOG-SONOSWDTX-00040331-83, GOOG-SONOSWDTX-00043467, GOOG-  
 25 SONOSWDTX-00043471, GOOG-SONOSWDTX-00043550, GOOG-SONOSWDTX-00037146,  
 26 GOOG-SONOSWDTX-00043548, GOOG-SONOSWDTX-00043676, GOOG-  
 27  
 28

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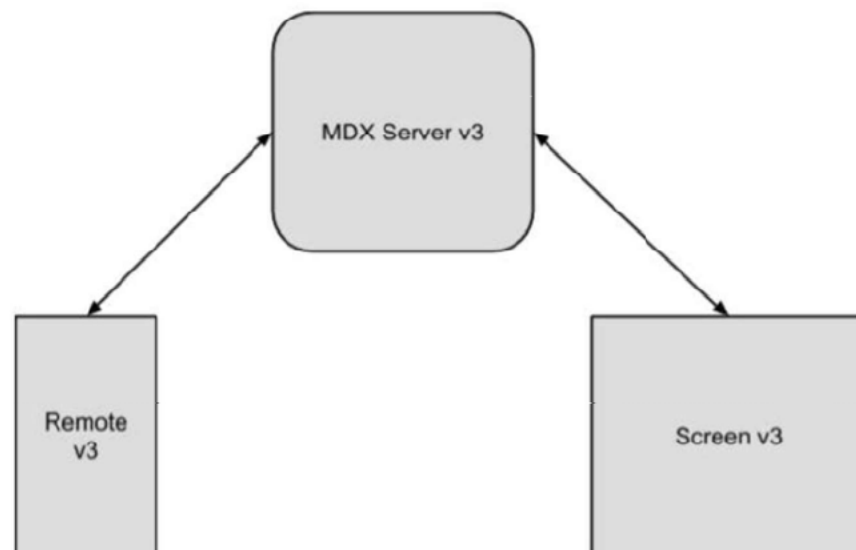
SONOSWDTX-00037178; *see also* GOOG-SONOSWDTX-00005033-8471, GOOG-SONOSWDTX-00022175-371, GOOG-SONOSWDTX-00036346-53611.

**SECOND SUPPLEMENTAL RESPONSE:**

Google maintains the General and Specific objections set forth above. Google further objects to this interrogatory on the grounds that it is vague, ambiguous, and overbroad to the extent it seeks information regarding products not specifically identified by make or model number in Sonos’s infringement contentions, or that have now been dropped by Sonos (*e.g.*, Podcast). Google also objects to this interrogatory to the extent it seeks to encompass Spotify, which is a separate, third-party application. Subject to and without waiving the foregoing General and Specific objections, Google responds, as follows:

Google fully incorporates herein by reference its responses to Interrogatory No. 14. Google further responds that casting operations involving the identified “autoplay” feature are generally described at least in GOOG-SONOSWDTX-00043467, GOOG-SONOSWDTX-00041491 and implemented in the source code provided by Google.

The illustration below provides a simplified view of the general architecture that is employed by devices running MDx applications (e.g., YouTube or YouTube Music):





GOOG-SONOSWDTX-00041650. In this diagram, “Remote v3” represents a Remote client device, such as a phone that runs a YouTube client implementing version 3 of the MDx protocol.

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The Remote communicates with the MDx server, which in turn communicates with the Screen. The function in the file `cast_md_x_session_service.ts` connects the Screen to the MDx server. Once connected, the Screen can receive “methods” (*i.e.*, messages or commands) from the MDx server. An example of one such method is the “setPlaylist” method.

A setPlaylist message is sent from the Remote to the MDx server and relayed to the Screen and requests that the Screen start playing the media identified by the `videoId`. *Id.* at 8. The parameters of a setPlaylist message sent to the Screen are shown below:

**Parameters:**

Name	Example	Description
<code>videoId</code>	<code>n_yx_8ndRF8</code>	Video that should start playback ASAP.
<code>currentTime</code>	<code>12.3</code>	Playback start time of <b>videoId</b> .
<code>currentIndex</code>	<code>2</code>	The 0-based index of the video in the given list.
		
<code>listId</code>	<code>PLhnyfMq1RRG1u-2M5SQLbXA</code>	List ID that this video is part of. If prefixed with <b>RQ</b> , the video is being played from the remote queue.
		
<code>watchNextToken</code>	<code>Us-TVg48ExM_1aH3J8AADPQ</code>	<b>Optional.</b> Opaque-to-the-client parameters used by the WatchNextService (usually a seed for the shuffle and/or mix playback).

*Id.*

In earlier versions of the MDx protocol (Version 2 and earlier) the setPlaylist message sent from the server to the Screen was a “list” of `videoIds` separated by a comma to represent the current

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1 playlist. In Version 3 of the MDx protocol (released in 2014) the setPlaylist message contains a  
 2 single videoId (i.e., it is no longer a list) used to identify the video to play. *Id.*

3 Upon receiving a setPlaylist message, the function handleMessage() creates a  
 4 PlaybackParams object to be passed to the accused setPlaylist() function. The PlaybackParams class  
 5 comprises a number of fields:

- 6 • eventDetails: a MdxRemoteQueueEvent object
- 7 • videoId: string from the videoId field in the incoming “setPlaylist” method
- 8 • listId: string from the listId field in the incoming “setPlaylist” method; ID of the remote  
 9 playlist

- 10 • [REDACTED]
- 11 • currentIndex: number derived from the currentIndex field in the incoming “setPlaylist”  
 12 method
- 13 • currentTime: number
- 14 • playerParams: string from the playerParams field in the incoming “setPlaylist” method
- 15 • watchNextParams: string from the params field in the incoming “setPlaylist” method
- 16 • isFling: boolean
- 17 • isMdxPlayback: boolean
- 18 • isVoiceRequest: boolean
- 19 • enableSafetyMode: boolean
- 20 • forceReloadPlayback: boolean derived from the forceReloadPlayback field in the incoming  
 21 “setPlaylist” method

22 As can be seen, the field “videoId” of the PlaybackParams class is a string from the videoId  
 23 field in the incoming “setPlaylist” message. To playback a video, the function setPlaylist() uses the  
 24 PlaybackParams object to play the video specified in the PlaybackParams.videoId field.

25 An example of a “method” the Screen can receive from the YouTube Frontend service is the  
 26 “GetWatchNext” method. Generally, at some point after the Screen begins playback of the current  
 27 media item, GetWatchNext is called by the Screen to request the next WatchEndPoint. In response  
 28 to GetWatchNext, the Screen receives WatchNextResponse, a protobuf message, which contains  
 the videoId for the next item to play, along with metadata for the item currently playing, and other  
 elements, such as an autoplay setting, for example.

Within the YT Main app, if the user has reached the end of a playlist, or there is no other  
 item to play next, the autoplay feature could be used to continue playing content. Specifically, when



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1 WatchNextResponse is loaded, the local variable upNextVideoId would be used to notify the  
2 Remote of what the next autoplay media item is, but upNextVideoId would not be used by any  
3 function to perform playback. upNextVideoId is not used for YT Music, at least because YT Music  
4 does not enable autoplay.

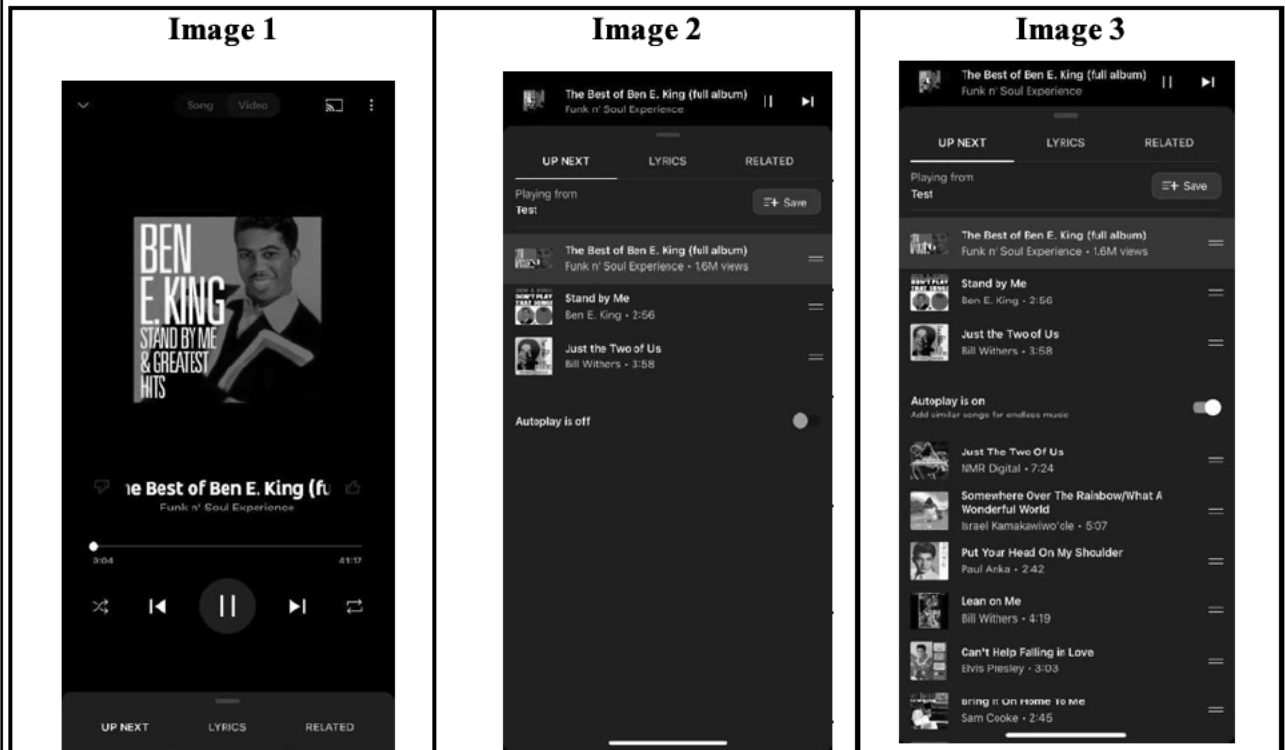
5 **THIRD SUPPLEMENTAL RESPONSE:** Google maintains the General and Specific  
6 objections set forth above. Google further objects to this Interrogatory as compound, irrelevant, and  
7 unduly burdensome in that it seeks a response “[f]or each of the YouTube, YouTube Music,  
8 YouTube TV, Google Play Music, Google Podcasts, and Spotify Media services.” For example,  
9 Sonos has dropped the “Google Podcasts” and “Spotify” applications from the case. Further, Sonos  
10 accused the Google Play Music application of infringing only its ’615 patent, and the Court has now  
11 granted summary judgment that the “Google Play Music” application does not infringe the ’615  
12 patent. Accordingly, Google will limit its response to the “You Tube Music,” “YouTube Music,”  
13 and YouTube TV applications. Google further objects to this interrogatory as vague, ambiguous,  
14 overbroad and unduly burdensome, including as to the phrase “describe in detail how an Accused  
15 Google Product (e.g., an Accused Cast-Enabled Media Player or Accused Pixel Device) receives  
16 and then plays back a sequence of media items (e.g., songs, podcast episodes, etc.) in connection  
17 with a given one of the aforementioned media services.” The accused YouTube applications and  
18 systems have numerous functionalities and features, involve many different playback scenarios, and  
19 are comprised of millions of lines of source code. Google also objects to this interrogatory to the

20 extent Sonos is seeking to shift the burden of proving infringement on to Google. It is Sonos’s  
21 burden, not Google’s to prove infringement. Moreover, Sonos’s definition of “Accused Google  
22 Product” purports to encompass thousands of different (and unspecified) hardware devices. It is not  
23 practical for Google to describe “in detail” every playback scenario for every hardware device.  
24 Sonos’s infringement contentions are also vague and ambiguous as to the particular functionality  
25 that it is accusing. Google will provide a reasonable level of detail regarding how the accused  
26 applications playback media based on its current understanding of Sonos’s contentions.

27 A Pixel Device running an accused YouTube application allows users to add media items to  
28 a playlist on their Pixel Device. For example, the images below are of a YouTube Music application

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1 playing a playlist containing three songs (“The Best of Ben E. King”, “Stand by Me”, and “Just the  
 2 Two of Us”) on the Pixel Device. Image 1 shows the currently playing song. Images 2 and 3 show  
 3 a toggle button that can be used by the user to enable or disable “Autoplay.” In Image 2, Autoplay  
 4 is turned off. In Image 3, Autoplay is turned on and additional recommended media items (e.g.,  
 5 “Just the Two of Us,” “Somewhere Over the Rainbow,” etc.) are displayed below the toggle button.  
 6 When the user created playlist is exhausted, the Pixel Device will begin playing Autoplay items.



19 Sticking with the above example, the file PlaybackQueue.java specifies the queue interface and the  
 20 file “DefaultPlaybackQueue.java” implements the queue. They maintain locally, on the Pixel  
 21 Device, a user-editable list of videos (“QUEUE\_LIST”) and an Autoplay List with recommended  
 22 videos (“AUTONAV\_LIST”). The user-editable list initially contains information for the three  
 23 songs (“The Best of Ben E. King”, “Stand by Me”, and “Just the Two of Us”) in the above example.  
 24 The Autoplay List contains information for the Autoplay items that follow (e.g., “Just the Two of  
 25 Us,” “Somewhere Over the Rainbow,” etc.). The user-editable and Autoplay lists are stored locally  
 26 on the Pixel Device as Android SparseArrays. After the Pixel Device exhausts playback of the user  
 27 editable list, the first media item in the Autoplay list is added to the user editable list and selected  
 28 for playback. A user may also select an Autoplay List item at any time, in which case the selected

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1 Autoplay List item (and all preceding items in the Autoplay List) are moved to the QUEUE\_LIST  
 2 and the selected item will be played back. For instance, if the user selects “Somewhere Over the  
 3 Rainbow,” then that item and the previous item in the Autoplay List (i.e., “Just the Two of Us”) are  
 4 added to the “QUEUE\_LIST” on the Pixel Device and “Somewhere Over the Rainbow” will be  
 5 played back.

6 The Pixel Device communicates with a WatchNext service over the Internet when playing  
 7 media items on the Pixel Device. *See* PlayerRequestManager.java, WatchNextFetcher.java; *see*  
 8 *also* GOOG-SONOSWDTX-00039785. *See* PlayerRequestManager.java<sup>3</sup>,  
 9 WatchNextFetcher.java<sup>4</sup>; *see also* GOOG-SONOSWDTX-00039785.<sup>5</sup> For instance, the Pixel  
 10 Device transmits a WatchNext request message to the WatchNext service to obtain metadata for the  
 11 currently playing media item. When starting playback of a playlist, a WatchNext request message  
 12 may also be used to obtain recommended Autoplay videos. There is not a “remote playback queue”  
 13 from which these recommended videos are retrieved. Instead, the recommended videos are  
 14 dynamically generated by a “MixService”—based on criteria such as the video the user is watching,  
 15 a user’s watch history, and various other criteria and algorithm inputs—and returned to the Pixel  
 16 Device in the WatchNext Response. Recommended videos are only temporarily maintained in the  
 17 cloud and discarded when, for instance, a user restarts playback of the current playlist.

18 The Pixel Device also communicates with a Player service over the Internet when playing  
 19 media items on the device. For example, in addition to the WatchNext request the Pixel Device  
 20 sends a GetPlayer request to the Player Service. The Player service determines in real-time which  
 21 Bandid server in Google’s Content Delivery Network a user should talk to for a particular request  
 22

23  
 24 <sup>3</sup> /java/com/google/android/libraries/youtube/player/net

25 <sup>4</sup> /java/com/google/android/libraries/youtube/player/net

26 <sup>5</sup> Unlike the situation where a receiver device is playing back media during casting—which may  
 27 involve the receiver device obtaining a WatchNext Response that includes Autoplay sets with  
 28 video renderers for a previous (previous video renderer) or next (next video renderer)  
 command—playback locally on the Pixel Device does not use previous and next video renderers.



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1 and returns to the Pixel Device Bandid URLs that point to Bandid servers. The Bandid URLs  
 2 are used by Pixel Devices to request chunks of media that are played back. GOOG-  
 3 SONOSNDCA-00115814 (Edge Streaming and Bandid CDN) at slide 9; GOOG-SONOSNDCA-  
 4 00115893 (Life of a Video Request) at 3 (“To serve, ustreamer must translate a player’s byte range  
 5 request into the corresponding 2MB chunk(s), or players may request specific segments (Live,  
 6 OTF).”). The Bandid Content Delivery Network will stream back chunks of media to the Pixel  
 7 Device. *See also* 7-27-2022 Bhattacharjee Rebuttal Rpt., ¶¶94-100.

9 A Pixel Device may also cast music for playback on a receiver device. When casting, the  
 10 accused receiver device will playback a cloud queue. Version 3 of Google’s “Multi-Device  
 11 Experience” (or MDx) protocol is used to manage playback on a receiver device during casting. In  
 12 particular, the YouTube application communicates with the MDx server, which in turn  
 13 communicates with the receiver device. The function in the file cast\_md\_x\_session\_service.ts  
 14 connects the receiver to the MDx server. Once connected, the receiver device can receive “methods”  
 15 (i.e., messages or commands) from the MDx server. An example of one such method is the  
 16 “setPlaylist” method. A setPlaylist message is sent from the Pixel Device running the YouTube  
 17 application to the MDx server. When the MDx server receives the setPlaylist message from the  
 18 YouTube application the handleMessage method is invoked (RealLoungeSessionManager<sup>6</sup>, line  
 19 740). The MDx server then sends a setPlaylist message to the receiver device  
 20 (RealLoungeSessionManager.java, line 1496. The MDx server then generates another setPlaylist  
 21 message that it sends to the receiver device. *Id.* at 8. The parameters of a setPlaylist message sent  
 22 from the MDx server to the receiver device are described above in Google’s Second Supplemental  
 23 Response and include the media item that should begin playing on the receiver device. *See also* 7-  
 24 27-2022 Bhattacharjee Rebuttal Rpt., ¶88. The receiver device receives the setPlaylist message sent

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 27  
 28 <sup>6</sup> 2021-02-01 YTServerMDx09292020/google3/java/com/google/ youtube/lounge/browserchannel

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1 by the MDx server. In particular, the method handleMessage (loungeadapter.ts<sup>7</sup>, line 905) processes  
 2 the setPlaylist message (loungeadapter.ts, line 924).

3 After receiving a setPlaylist message, the receiver device sends a WatchNext request  
 4 message to YouTube’s InnerTube service and a GetPlayer request message to YouTube’s Player  
 5 service. *See, e.g.* GOOG-SONOSWDTX-00039491. The WatchNext request message includes,  
 6 among other things, the videoID of the media currently playing  
 7 (innertube\_watch\_next\_service.proto, line 97) and the playlistID corresponding to the cloud queue  
 8 at the MDx server (innertube\_watch\_next\_service.proto, line 103). The WatchNext request is  
 9 received by the InnerTube servers which invokes handle\_get\_watch\_next  
 10 (innertube\_watch\_next.py, line 349). The handle\_get\_watch\_next function invokes  
 11 \_get\_watch\_next() (innertube\_watch\_next.py, line 404), which processes the request  
 12 (innertube\_watch\_next.py, line 671) and returns to the playback device a WatchNext response  
 13 (innertube\_watch\_service.proto; \_content.py, starting at line 796) with a large volume of  
 14 information, primarily relating to metadata for the currently playing media item. Within this large  
 15 volume of information is the videoId for the next media item in the cloud queue. The GetPlayer  
 16 request causes the Player service to return to the receiver device Bandid URLs that point to the  
 17 Bandid server from which the receiver device should request chunks of the current media item.  
 18 The receiver will send a get WatchNext request and GetPlayer request each time a new song or  
 19 video starts playing. *See also* 7-27-2022 Bhattacharjee Rebuttal Rpt., ¶¶90-92.

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 27 <sup>7</sup> 2021-02-01 YTReivers09292020/google3/video/youtube/src/web/javascript/  
 28 library/mdx/screen\_ts

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1 DATED: November 3, 2022

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11  
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13 **CERTIFICATE OF SERVICE**

14 The undersigned hereby certifies that all counsel of record who have consented to electronic  
15 service are being served with a copy of this document via email on November 3, 2022.  
16

17 /s/ Nima Hefazi

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